Chemical Analysis Report

WQAP-2021-07-20-03

Florida Department of Environmental Protection
Central Laboratory
2600 Blair Stone Road
Tallahassee, FL 32399-2400
DOH Accreditation E31780

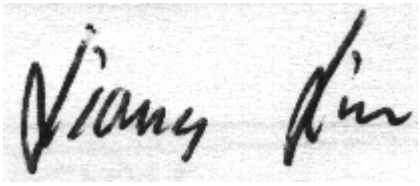
Event Description: **Algal Bloom Response -SOROC**
Request ID: **RQ-2021-07-12-40**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

Send Reports to:
FL Dept. of Environmental Protection
2295 Victoria AVE
Suite 364
Fort Myers, FL 33901
Attn: Kirby Wolfe

For additional information please contact
Colin Wright, Ph.D.
Liang-Tsair Lin, Ph.D.
Kerry Tate, Ph.D.
Dr. rer. nat. Bettina Steinbock
Thekkekalathil Chandrasekhar, Ph.D, QA Officer
Phone (850) 245-8085

Certified by: Liang Lin, Environmental Administrator

Date Certified: 16-AUG-2021 10:06



Case Narrative

Unless otherwise noted, all samples included in this report were received in accordance with protocols referenced in Chapter 62-160, Florida Administrative Code (F.A.C.). Results published in this report pertain only to the samples as submitted to, and received by the laboratory. All times in this report are adjusted to the applicable Eastern Time Zone (EST or EDT).

Results for the following analytical groups are included in this report: Nutrients and Pesticides.

Scientific notation may be used in reporting very large or small values. Values reported using scientific notation will take the form of the following example: 1.3E+03, which is equivalent to 1.3×10^3 or 1300.

Unless otherwise noted, analytical values for soil and sediment samples are reported on a dry weight basis, and analytical values for waste and tissue samples are reported on a wet weight basis.

Results for TNI accredited tests met requirements established by The NELAC Institute. A double asterisk (**) is used to indicate an analyte/matrix/method for which the laboratory is not TNI accredited by the Florida Department of Health Environmental Laboratory Certification Program or where accreditation for that field of testing is not applicable.

Any significant anomalies or deviations from established protocols are documented in Non-Conformance Reports, which, where appropriate, are included within this analytical report. Additional comments related to specific analytical tests may be included as remarks following the analytical results for each sample. Such comments and remarks are for informational purposes only and are not intended to convey judgement about the usability of the reported data.

A quality control report on the performance of the test method for the submitted samples is included. Uncertainty associated with the analytical results contained in this report can be estimated from the reported quality assurance results and from published quality control acceptance limits for each analytical test. Matrix quality control results (matrix spike recoveries and matrix sample precision) pertain only to the matrix sample tested and do not necessarily reflect test method performance for other samples.

Typical matrix quality control (QC) measurements may include matrix spike recovery, matrix spike duplicate recovery, matrix spike precision and matrix sample precision. Not all matrix QC results may be available or reportable; where they are not an explanation is provided. Typical reasons for unavailable QC results include, but are not limited to, a) insufficient matrix sample to perform some or all QC measurements; b) analyte concentration in the sample replicated was too low for a meaningful measurement of precision and c) analyte concentration in the matrix sample spiked was too high (relative to the amount of analyte spiked) for a meaningful measurement of recovery. Where matrix QC results are unavailable, other method performance metrics (e.g., LCS recovery, LCS precision, surrogate recovery) may be used to assess performance of the method. Comments explaining any missing QC measurements are not intended to convey any adverse conclusions about the quality of the reported data.

Precision is reported as relative percent difference unless otherwise noted.

Quality Control codes as defined below may be used in this report to indicate results that are associated with one or more quality control elements which did not fall within established test method criteria. Such results may be qualified as estimates using a J qualifier as required by 62-160 F.A.C. Explanations are included in the report for any results that were reported as estimates for other reasons.

QC Codes used in this report may include:

- LCS – Recovery for the batch Laboratory Control Sample (LCS) was outside existing control limits;
- MS – Recovery for the batch matrix spike (MS) was outside existing control limits;
- CCV – Recovery for a continuing calibration verification (CCV) standard was outside existing control limits;
- SUR – Recovery of a surrogate (SUR) for associated analytes was outside existing control limits;
- RPD – The precision, measured as relative percent difference (RPD), of batch replicate measurements was outside existing control limits;
- RSD – The precision, measured as relative standard deviation (RSD), of batch replicate measurements was outside existing control limits;
- SMP – Sample - used precision derived from replicate analyses of a sample;

The following data qualifiers are used, where applicable, in this report as specified in 62-160 F.A.C.

- A - Value reported is the mean of two or more determinations.
- B - Results based on colony counts outside the acceptable range.
- I - The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
- J - Estimated value and/or the analysis did not meet established quality control criteria.
- K - Actual value is known to be less than value given.
- L - Actual value is known to be greater than value given.
- N - Presumptive evidence of presence of material.
- O - Sampled, but analysis lost or not performed.
- Q - Sample held beyond normal holding time.
- T - Value reported is less than the criterion of detection.
- U - Material was analyzed for but not detected. The reported value is the method detection limit for the sample analyzed.
- V - Analyte was detected in both sample and method blank.
- X - Too few individuals to calculate SCI value.
- Y - The laboratory analysis was from an unpreserved or improperly preserved sample. The data may not be accurate.
- Z - Colonies were too numerous to count (TNTC).

Quality control information from overflow laboratories may not be included in this report. Please refer to the associated report from the overflow laboratory for additional information.

Sample Location: Marina Town **Collection Date/Time: 07/19/2021 09:30**

Field ID: HAB-SD-071921-01 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2263123	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P401259	
		Cylindrospermopsin	0.10	U	ug/L	P401259	
		Desmethyl microcystin LR	0.25	U	ug/L	P401259	
		Microcystin HilR**	0.25	U	ug/L	P401259	
		Microcystin HtyR**	0.25	U	ug/L	P401259	
		Microcystin LA	0.10	U	ug/L	P401259	
		Microcystin LF	0.10	U	ug/L	P401259	
		Microcystin LR	0.25	U	ug/L	P401259	
		Microcystin LW	0.25	U	ug/L	P401259	
		Microcystin LY	0.10	U	ug/L	P401259	
		Microcystin RR	0.10	U	ug/L	P401259	
		Microcystin WR	0.50	U	ug/L	P401259	
		Microcystin YR	0.25	U	ug/L	P401259	
		Nodularin-R**	0.10	U	ug/L	P401259	
2263124	EPA 350.1 Rev. 2.0	Ammonia-N	0.088		mg N/L	P401597	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.1		mg N/L	P402245	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.12		mg N/L	P401283	
	EPA 365.1 Rev. 2.0	Total-P	0.16		mg P/L	P401505	
2263125	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.12		mg P/L	P401238	

Ref. Method and Comment:
EPA 350.1 Rev. 2.0: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.
EPA 351.2 Rev. 2.0: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Quality Assurance Report
Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P401597

Component	Result	Code	Units
Ammonia-N	0.002	U	mg N/L

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P402245

Component	Result	Code	Units
Kjeldahl Nitrogen	0.080	U	mg N/L

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P401283

Component	Result	Code	Units
NO2NO3-N	0.004	U	mg N/L

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P401505

Component	Result	Code	Units
Total-P	0.002	U	mg P/L

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P401238

Component	Result	Code	Units
O-Phosphate-P	0.004	U	mg P/L

Reference Method: EPA 8321B
Batch ID: P401259

Component	Result	Code	Units
Anatoxin-a	0.25	U	ug/L
Cylindrospermopsin	0.10	U	ug/L
Desmethyl microcystin LR	0.25	U	ug/L
Microcystin HilR	0.25	U	ug/L
Microcystin HtyR	0.25	U	ug/L
Microcystin LA	0.10	U	ug/L
Microcystin LF	0.10	U	ug/L
Microcystin LR	0.25	U	ug/L
Microcystin LW	0.25	U	ug/L
Microcystin LY	0.10	U	ug/L
Microcystin RR	0.10	U	ug/L
Microcystin WR	0.50	U	ug/L
Microcystin YR	0.25	U	ug/L
Nodularin-R	0.10	U	ug/L

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P401597

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	99.8		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P402245

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	108		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P401283

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	104		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P401505

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	105		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P401238

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	100		P	90 - 110

Reference Method: EPA 8321B
Batch ID: P401259

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	102		P	40 - 150
Cylindrospermopsin	99.2		P	40 - 150
Desmethyl microcystin LR	99.9		P	40 - 150
Microcystin HilR	105		P	40 - 150
Microcystin HtyR	105		P	40 - 150
Microcystin LA	98.9		P	40 - 150
Microcystin LF	103		P	40 - 150
Microcystin LR	129		P	40 - 150
Microcystin LW	108		P	40 - 150
Microcystin LY	99.4		P	40 - 150
Microcystin RR	104		P	40 - 150
Microcystin WR	105		P	40 - 150
Microcystin YR	101		P	40 - 150
Nodularin-R	105		P	40 - 150

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P401283

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2263115	NO2NO3-N	104	104	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P401505

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2263115	Total-P	109	109	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P401238

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2263117	O-Phosphate-P	100	101	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P401259

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2263097	Anatoxin-a	112	114	P/P	40 - 150
2263097	Cylindrospermopsin	94.8	106	P/P	40 - 150
2263097	Desmethyl microcystin LR	99.1	109	P/P	40 - 150
2263097	Microcystin HilR	101	114	P/P	40 - 150
2263097	Microcystin HtyR	94.7	105	P/P	40 - 150
2263097	Microcystin LA	97.7	103	P/P	40 - 150
2263097	Microcystin LF	93.9	100	P/P	40 - 150
2263097	Microcystin LR	115	121	P/P	40 - 150
2263097	Microcystin LW	101	107	P/P	40 - 150
2263097	Microcystin LY	90.2	98.7	P/P	40 - 150
2263097	Microcystin RR	97.4	105	P/P	40 - 150
2263097	Microcystin WR	94.4	115	P/P	40 - 150
2263097	Microcystin YR	95.7	109	P/P	40 - 150
2263097	Nodularin-R	105	110	P/P	40 - 150

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P401597

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2263124	Ammonia-N	1.68	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P402245

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2263131	Kjeldahl Nitrogen	1.53	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P401283

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2263115	NO2NO3-N	0.276	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P401505

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2263115	Total-P	0.146	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P401238

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2263117	O-Phosphate-P	0.538	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P401259

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2263097	Anatoxin-a	1.71	Spike	P	0 - 30
2263097	Cylindrospermopsin	11.3	Spike	P	0 - 30
2263097	Desmethyl microcystin LR	9.25	Spike	P	0 - 30
2263097	Microcystin HilR	12.0	Spike	P	0 - 30
2263097	Microcystin HtyR	10.4	Spike	P	0 - 30
2263097	Microcystin LA	5.10	Spike	P	0 - 30
2263097	Microcystin LF	6.27	Spike	P	0 - 30
2263097	Microcystin LR	5.11	Spike	P	0 - 30
2263097	Microcystin LW	6.04	Spike	P	0 - 30
2263097	Microcystin LY	9.03	Spike	P	0 - 30
2263097	Microcystin RR	7.71	Spike	P	0 - 30
2263097	Microcystin WR	19.3	Spike	P	0 - 30
2263097	Microcystin YR	12.9	Spike	P	0 - 30
2263097	Nodularin-R	4.13	Spike	P	0 - 30

Quality Assurance Report
Precision

* Sample, spike and/or laboratory control sample precision (LCS) is reported.

Quality Assurance Report
Surrogates

Lab Sample ID: 2263123
Field Sample ID: HAB-SD-071921-01

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR-d7	80.9	P	30 - 160
EPA 8321B	Microcystin LR ethyl-d5	78.9	P	30 - 160

Quality Assurance Report
Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A106713
Included Lab Sample IDs: 2263125

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.2	101	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A106730
Included Lab Sample IDs: 2263124

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	106	106	P/P	90 - 110

Reference Method: EPA 8321B
Run ID: A106757
Included Lab Sample IDs: 2263123

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	96.7	118	P/P	50 - 160
Cylindrospermopsin	90.8	100	P/P	50 - 160
Desmethyl microcystin LR	92.8	102	P/P	50 - 160
Microcystin HilR	92.2	110	P/P	50 - 160
Microcystin HtyR	93.6	107	P/P	50 - 160
Microcystin LA	96.0	106	P/P	50 - 160
Microcystin LF	96.2	108	P/P	50 - 160
Microcystin LR	103	110	P/P	50 - 160
Microcystin LW	103	111	P/P	50 - 160
Microcystin LY	93.3	104	P/P	50 - 160
Microcystin RR	96.0	105	P/P	50 - 160
Microcystin WR	110	105	P/P	50 - 160
Microcystin YR	103	112	P/P	50 - 160
Nodularin-R	95.2	111	P/P	50 - 160

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A106820
Included Lab Sample IDs: 2263124

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	105	103	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A106850
Included Lab Sample IDs: 2263124

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	97.6	98.0	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A107173
Included Lab Sample IDs: 2263124

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	99.8	99.8	P/P	90 - 110

Quality Assurance Report
Calibration Verification

* Pass/Fail determinations are made for each bracketing calibration verification check.
Control limits for initial calibration checks may be different from those for continuing checks, depending on method requirements.
Where they are different, both control limits are provided.

Quality Assurance Report
Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery		Precision		
					LCS	SMP	MS
EPA 350.1 Rev. 2.0	Ammonia-N	99.8					1.68
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	108					1.53
EPA 353.2 Rev. 2.0	NO2NO3-N	104	104	104			0.276
EPA 365.1 Rev. 2.0	Total-P	105	109	109			0.146
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	100	100	101			0.538
EPA 8321B	Anatoxin-a	102	114	112			1.71
	Cylindrospermopsin	99.2	106	94.8			11.3
	Desmethyl microcystin LR	99.9	99.1	109			9.25
	Microcystin HilR	105	101	114			12.0
	Microcystin HtyR	105	105	94.7			10.4
	Microcystin LA	98.9	97.7	103			5.10
	Microcystin LF	103	93.9	100			6.27
	Microcystin LR	129	115	121			5.11
	Microcystin LW	108	101	107			6.04
	Microcystin LY	99.4	90.2	98.7			9.03
	Microcystin RR	104	105	97.4			7.71
	Microcystin WR	105	94.4	115			19.3
	Microcystin YR	101	109	95.7			12.9
	Nodularin-R	105	110	105			4.13

Reference Method Descriptions

Method	Description	Associated Samples
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2263124
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2263124
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2263124
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2263124
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2263125
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2263123

Preparation and Analysis Log

Ref. Method	Received Date	Prep Date/Time	Prepared By	Analysis Date/Time	Analyzed By	Associated Samples
EPA 350.1 Rev. 2.0	07/20/2021			07/27/2021 13:31	Roberta Tatti	2263124
EPA 351.2 Rev. 2.0	07/20/2021	08/10/2021 12:37	Benjamin T. Nordmann	08/11/2021 09:50	Virginia P. Brown	2263124
EPA 353.2 Rev. 2.0	07/20/2021			07/21/2021 09:52	Beverly Y. Sanders	2263124
EPA 365.1 Rev. 2.0	07/20/2021	07/23/2021 17:05	Madeline Gruver	07/26/2021 11:06	Shengyu Ding	2263124
EPA 365.1 Rev. 2.0 dissolved	07/20/2021			07/20/2021 15:16	Ping Hua	2263125
EPA 8321B	07/20/2021	07/21/2021 09:00	Pramila Ghimire	07/21/2021 11:54	Pramila Ghimire	2263123